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LIKELIHOOD OF ESCAPE, LIKELIHOOD OF DANGER, AND PANIC BEHAVIOR* [1]

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A. INTRODUCTION

Group panic is a dramatic phenomenon that has stimulated the imagination of social philosophers and social scientists for at least half a century. More recently attempts have been made to delineate the individual and situational variables affecting panic. For example, experimental analogues and *post hoc* analyses of panics and disasters have specified such variables as individual differences in response to threat (3, 8, 10, 14); degree of organization within the group (6); presence or absence of a leader (6); group size (2); social influence within the group (6, 9, 12); magnitude of threat (9); cues concerning time allotment (9); forewarnings (10); and rumors (5, 7).

These variables have been assumed to influence the degree of perceived danger in a potential panic situation. The notion of perceived danger has, however, been imprecisely conceptualized. Variables affecting degree of perceived danger can be more satisfactorily conceptualized by drawing distinctions among (*a*) amount of physical danger, (*b*) perceived likelihood of escape, and (*c*) perceived likelihood of danger if escape attempts fail.

Kelley *et al.* (9) have suggested that the distinction between amount of physical danger and perceived likelihood of escape is an important one. In previous experiments manipulating amount of physical danger (6, 9, 12), perceived likelihood of escape, and perceived likelihood of danger were either ignored or assumed to be high. Nature of the interaction among these three variables cannot be determined from previous studies.

Anecdotal evidence suggests that amount of physical danger is insufficient to account for behavior in potential panic situations. When people feel definitely entrapped, uncoordinated group behavior characteristic of panic does not occur, in spite of high physical danger. Miners who perceive themselves to be definitely entrapped in mines do not attempt to escape, according to cases cited by Quarantelli (14). In short, the individual's own definition of the situation,

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[1] This study was conducted while the first author was a recipient of an NSF undergraduate research fellowship in psychology.

in terms of expectation about likelihood of escape and evaluation of likelihood of danger, is a crucial element in situations of potential panic.

Moreover, evidence from the stress literature suggests a curvilinear relation between degree of ambiguity of the stressor and degree of anxiety experienced (1, 13). It is likely, then, that a greater degree of psychological stress will be experienced—and hence strongest escape attempts will be made—in conditions where perceived likelihood of escape and perceived likelihood of danger (if escape attempts fail) are ambiguous.

The present experiment investigates intensity of escape attempts from a simulated panic situation as a function of perceived likelihood of escape from a potentially stressful situation and perceived likelihood of danger if escape attempts fail. Magnitude of physical danger was not manipulated since previous work (9) has demonstrated a relationship between magnitude of physical danger and uncoordinated behavior. In this study physical danger was held constant across all conditions by telling *S*s that they would receive a series of electric shocks just below their shock thresholds if they did not escape. It is hypothesized that an individual's escape attempts will be more intense when likelihood of escape and likelihood of danger are perceived as highly ambiguous.

The present study differs procedurally in certain respects from previous ones. Unlike the Kelley *et al.* (9) and Mintz (12) studies, no cues are available in this experiment about the behavior of other group members. Also different from other studies is our dependent variable—intensity of the *S*'s escape attempts. Previous studies have operationalized panic in terms of average time of group escape (12) or percentage of group members escaping within a specified time (9). The dependent measure used in the present study operationalizes what Kelley *et al.* (9) refer to as an "attitude toward the urgency of escape," rather than the obvious consequences of group members' panic responses (i.e., jamming or stampeding).

B. Method

1. *Subjects*

Subjects were 105 female college students who volunteered from introductory psychology courses. No indication of the nature of the study was given at the time of volunteering. Nineteen *S*s were disqualified for the following reasons: two reported heart murmurs, nine refused to sign the release form indicating consent to participate in research involving electric shock, and eight misunderstood instructions. Subjects were assigned randomly to one of the nine experimental conditions.

2. *Design*

A 3 × 3 factorial design was used. High, medium, or low likelihood of escape was manipulated by the number of opportunities given for escape from the stressful situation. The second variable, likelihood of danger, consisted of high, medium, or low probability of receiving painful electric shock if the *S* failed to escape within the allotted intervals.

3. *Procedure*

Each *S* was led to believe that she was one of five *S*s participating in the study. In reality, only one *S* participated; the presence of the other four group members was simulated. The *S* was told that the study required group members not to have visual contact with each other and that their arrival times had been varied to avoid prior interaction. The *S* was allegedly the fifth and final group member to arrive. To ensure credibility of the deception a number of precautions were taken. First, since *S*s volunteered by signing in a booklet, four false names were entered in the booklet for each *S* needed. Thus, if the *S* should look through the booklet (as many did), she would see that four other persons had volunteered to participate at the same time. Second, coats and books were placed on a chair in the experimental room so the *S* would assume that other group members had already arrived and were seated in the other four cubicles. Third, when the *E* collected questionnaires, the doors of the four (vacant) cubicles were opened and closed so that the real *S* would hear the sounds and assume the presence of other persons. Finally, when *S*s were requested to communicate with the *E*, taped responses of the other four simulated group members were heard by the real *S*.

Inside the *S*'s soundproof booth were a bar-press lever, a shock apparatus, and a communication system between the *E* and the *S*s. After being seated in the booth, the *S* was introduced to the "other four group members" via tape-recorded instructions, and heard each group member state her number and name. The *S* was instructed to press the lever of the bar-press apparatus as fast as possible for an unstated time duration (four minutes) to obtain a measure of "psychomotor ability." This speed score was used as a baseline for the dependent measure, intensity of escape attempt.

Subjects were told they were participating in a study of panic behavior and were asked to complete a questionnaire assessing their physical health. They were also informed that the experiment involved electric shock, and were asked to sign a "release form," indicating willingness to participate. The real *S* heard the four simulated group members reply affirmatively before giving her response.

Individual pain thresholds for electric shock were then determined in order to demonstrate to the *S* that electric shocks actually were being used in the experiment. Electrodes were attached to the *S*'s nonpreferred hand and shock intensity increased until she reported discomfort.

4. *Experimental Manipulations*

The *S* was told that the entire group was in a dangerous situation from which members could escape within a prescribed number of time intervals. Only one *S* could escape within a single time interval—the person who exerted the greatest effort by hitting the bar-press apparatus fastest during that interval. (A jam would allegedly occur, and no one would escape, if two or more persons hit the lever at approximately the same rate during an interval.)

Likelihood of escape was manipulated by varying the number of four-minute intervals comprising the opportunity for escape: high (10 intervals), medium (six intervals), or low (two intervals). For example, in the six-interval condition, it was pointed out that the six opportunities provided sufficient opportunity for each of the five group members to escape even if one jam occurred. Three conditions of likelihood of danger (if the *S* did not escape) were created by appropriate instructions. The *S* was told that for group members who did not escape during the number of time intervals available there would be 100 percent (or 50 percent or 10 percent) probability of receiving painful electric shocks. Prior to the escape phase the *S* rated on a seven-point scale her uneasiness about getting shocked.

5. *Dependent Measure*

Data were obtained only from the first escape interval, after which the experiment was terminated. Therefore, no *S* actually received a series of shocks near her shock threshold. Intensity of the *S*'s escape attempt was measured by the algebraic difference between frequency of lever-pressing on the first escape interval and her base-rate: i.e., the score obtained under nonstressful conditions at the beginning of the experiment.

C. Results

1. *Success of Manipulations*

Comments made during the postexperimental interview and responses on the open-ended questionnaire attested to the success of the procedural deception: *S*s clearly believed that four other persons had participated in the experiment with them. Questionnaire responses, as well as fear ratings, showed that

Ss also accepted the reality of their receiving electric shock during the course of the experiment. On the rating scale, a score of seven indicated maximum uneasiness about receiving shock. For the nine experimental conditions, mean fear ratings fell between six and seven. Moreover, there was no significant difference among experimental conditions in fear ratings.

2. *Escape Attempts*

A significant main effect was found for the likelihood of escape variable ($F = 4.45$, $p < .025$). The main effect was not significant for the likelihood of danger variable, nor was the interaction term significant. The analysis of variance also indicated that escape attempts were related in a curvilinear fashion to perceived likelihood of escape. The statistical test for the quadratic component in the trend analysis for the likelihood of escape variable was significant at the .025 level ($F = 6.36$).

Means for the escape data are presented in Table 1. Although there was not a significant interaction term in the analysis of variance, these data are presented to show that the overall curvilinearity of the relation between escape attempts and likelihood of escape is clearly accounted for by the medium and high levels of likelihood of danger.

The percentage of *Ss* in each condition who did not try to escape on the first escape interval constitutes an additional measure of intensity of escape. (Subjects did not know, of course, that the experiment would be terminated after the first escape interval.) Results showed that only 13 percent of the *Ss* (11 of 86) failed to attempt to escape on the first escape interval; these *Ss* were evenly distributed across the experimental conditions.

3. *Correlation of Fear and Escape*

Although there was no difference among conditions in fear ratings, escape attempts might be differentially related to fear within the nine experimental conditions. Therefore, Pearson product-moment correlations were calculated between fear ratings and intensity of escape attempts, collapsing across the likelihood of danger conditions. The correlations were positive and significantly

TABLE 1
MEAN INCREASE IN LEVER-PRESSING RELATIVE TO BASE RATE

Likelihood of danger	Likelihood of escape		
	High	Medium	Low
High	29.97	58.03	38.56
Medium	22.96	47.63	30.06
Low	23.19	42.21	45.93

greater than zero under conditions of high and low likelihood of escape ($r =$ .45 and .42, respectively; $p < .05$). When likelihood of escape was medium, the correlation was not significantly greater than zero ($r = -.13$).

D. Discussion

1. *Perceived Likelihood of Escape and Perceived Likelihood of Danger*

Our prediction that escape attempts would be greater when both likelihood of escape and likelihood of danger were perceived as highly ambiguous was partially supported by data from the present study. Results disclosed that intensity of escape attempts was related curvilinearly to likelihood of escape, with *S*s trying harder to escape when they were unsure that they would be able to do so. Likelihood of danger (if escape failed) apparently had little salience as a stressor for the *S*s. The problem of the moment—the necessity of escaping to avoid imminent shock—seems to have completely occupied *S*s' focus of attention.

The curvilinear relation between escape attempts and likelihood of escape may explain some puzzling cases of panic behavior. For example, panic sometimes occurs when perceived danger and perceived likelihood of escape is only moderate. Yet, when danger is very high and likelihood of escape is very low, panic sometimes does not occur. Thus, panic may not occur in a situation where common sense would most expect it: in a highly dangerous situation in which there is little chance of escape, as in the example of men trapped in a mine.

It should be remembered that this experiment was characterized by considerable ambiguity. Subjects had no visual cues about other group members, no indication whether others would attempt to escape, no information about the duration of each escape interval, and low certainty about the magnitude of shocks to be received. Actual panic situations likewise seem to be extremely ambiguous. Panics have sometimes been prevented in real life situations by the emergence of a leader or by such incidents as playing music in a burning orchestra hall (11). Effectiveness of these sorts of measures is unlikely to result from any unique characteristics of such actions. Instead, any cue that reduces ambiguity in the situation will probably lessen intensity of individual escape attempts, and thus reduce uncoordinated behavior in the group.

2. *Fear and Escape*

It has been generally assumed that level of fear is related positively to response in a potential panic situation (9). Interestingly, in the present study correlational data within conditions showed that level of fear and escape

intensity were not related in the most stressful condition, medium likelihood of escape. Inspection of the data revealed that *Ss* with high fear of shock in this stressful condition performed poorly, thereby accounting for the observed nonsignificant correlation. Many other studies have also reported that extremely high levels of anxiety impair performance (4).

E. Conclusion

In conclusion, one variable—likelihood of escape—influenced intensity of escape responses. A second variable—likelihood of danger if escape attempts fail—did not systematically affect intensity of escape attempts. It should be remembered that across all conditions of likelihood of escape, intensity of objective danger was held constant and, according to *Ss*' self-ratings, the threat of shock provoked considerable uneasiness. As Kelley *et al.* (9) have stated, it is unwarranted to assume that *Ss*' perception of likelihood of escape is high and constant across all conditions of a panic experiment in which other variables are manipulated. Lack of experimental control for likelihood of escape in other studies may help explain inconsistencies among previous research findings in this area.

F. Summary

This experiment investigated the effect of two variables on intensity of escape attempts from a simulated panic situation. The factorial design utilized three levels of likelihood of escape (high, medium, low) and three levels of likelihood of danger if escape attempts failed (high, medium, low). Subjects, 86 female undergraduates, believed they would receive a series of painful electric shocks unless they successfully escaped from the situation by pressing a lever faster than other members of the group. Results showed a curvilinear relation between likelihood of escape and intensity of escape attempts. Likelihood of danger if escape failed did not significantly affect intensity of *Ss*' escape attempts.

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